Operating Instructions

Pressure transmitter with ceramic measuring cell

VEGABAR 82

Slave sensor for electronic differential pressure

Document ID: 45050

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Safety instructions for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

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1 About this document

1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained specialist personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution: If this warning is ignored, faults or malfunctions can result.

Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.

Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

Ex applications
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

→ **Action**
This arrow indicates a single action.

1 **Sequence of actions**
Numbers set in front indicate successive steps in a procedure.

Battery disposal
This symbol indicates special information about the disposal of batteries and accumulators.

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2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

2.2 Appropriate use

VEGABAR 82 is a slave sensor for electronic differential pressure measurement.

You can find detailed information on the application range in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

2.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

2.5 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, we confirm successful testing of the product.

You can find the CE Certificate of Conformity in the download section of our homepage.

2.6 Measuring range - permissible process pressure

The permissible process pressure is specified on the type label with "process pressure", see chapter "*Configuration*". For safety reasons, this range must not be exceeded. This applies also if a measuring cell with higher measuring range (order-related) than the permissible pressure range of the process fitting is installed.

2.7 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

3 Product description

3.1 Configuration

Type plate

The nameplate contains the most important data for identification and use of the instrument:

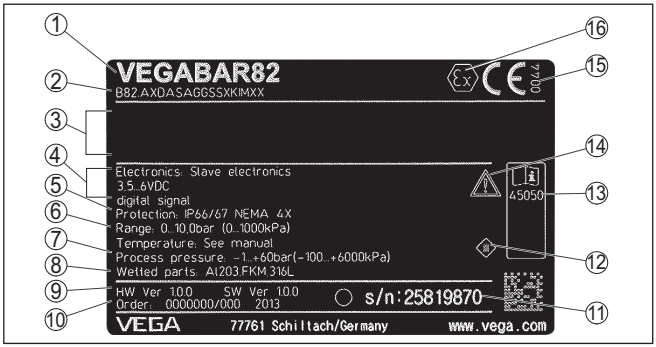

Fig. 1: Layout of the type label (example)

1 *Instrument type*
2 *Product code*
3 *Field for approvals*
4 *Power supply and signal output, electronics*
5 *Protection rating*
6 *Measuring range*
7 *Permissible process pressure*
8 *Material, wetted parts*
9 *Hardware and software version*
10 *Order number*
11 *Serial number of the instrument*
12 *Symbol of the device protection class*
13 *ID numbers, instrument documentation*
14 *Reminder to observe the instrument documentation*
15 *Notified authority for CE marking*
16 *Approval directive*

Serial number

The type label contains the serial number of the instrument. With it you can find the following data on our homepage:

- Product code of the instrument (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions at the time of shipment (PDF)
- Order-specific sensor data for an electronics exchange (XML)
- Test certificate pressure transmitters (PDF)

Go to www.vega.com, "*VEGA Tools*" and "*Serial number search*".

As an alternative, you can find the data via your Smartphone:

- Download the smartphone app "*VEGA Tools*" from the "*Apple App Store*" or the "*Google Play Store*"
- Scan the Data Matrix code on the type label of the instrument or
- Enter the serial number manually in the app

Scope of this operating instructions manual

This operating instructions manual applies to the following instrument versions:

- Hardware from 1.0.0
- Software version from 1.0.0

Scope of delivery

The scope of delivery encompasses:

- VEGABAR 82 pressure transmitter
- Connection cable to the master sensor
- Cable gland for the master sensor
- Documentation
  - this operating instructions manual
  - Test certificate measuring accuracy (optional)
  - Supplementary instructions manual "*Plug connector for continuously measuring sensors*" (optional)
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - if necessary, further certificates

3.2 Principle of operation

Electronic differential pressure measurement

The VEGABAR 82 slave sensor is combined with a sensor from the VEGABAR 80 series for electronic differential pressure measurement.

The sensors are connected via a screened four-wire cable. The measured value from the slave sensor is read in and factored into the calculations. Parameter adjustment is carried out through the master sensor.

Measured variables

The electronic differential pressure measurement is suitable for the measurement of the following process variables:

- Level
- Flow
- Differential pressure
- Density
- Interface

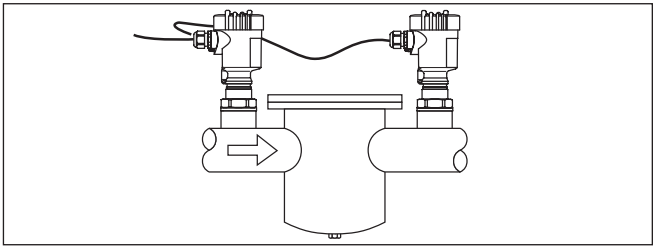

Fig. 2: Electronic differential pressure measurement through Master/Slave combination

Application area

VEGABAR 82 is suitable for applications in virtually all industries. It is used for the measurement of the following pressure types.

- Gauge pressure

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- Absolute pressure
- Vacuum

Measured products

Measured products are gases, vapours and liquids.

Depending on the process fitting and measurement setup, measured products can be also viscous or contain abrasive substances.

Measuring system

Sensor element is the CERTEC® measuring cell with robust ceramic diaphragm. The process pressure deflects the ceramic diaphragm and causes a capacitance change in the measuring cell. This capacitance change is converted into an electrical signal and outputted as measured value via the output signal.

The CERTEC® measuring cell is available in two sizes:

- ø 17.5 mm with small process fittings
- ø 28 mm with large process fittings as well as all flange connections

Pressure types

The measuring cell design depends on the selected pressure type.

Relative pressure: the measuring cell is open to atmosphere. The ambient pressure is detected in the measuring cell and compensated. It thus has no influence on the measured value.

Absolute pressure: the measuring cell is evacuated and encapsulated. The ambient pressure is not compensated and does hence influence the measured value.

Relative pressure, climate-compensated: the measuring cell is evacuated and encapsulated. The ambient pressure is detected through a reference sensor in the electronics and compensated. It thus has no influence on the measured value.

Seal concepts

The following presentations show the installation of the CERTEC® measuring cell into the process fitting and the different seal concepts.

Recessed installation

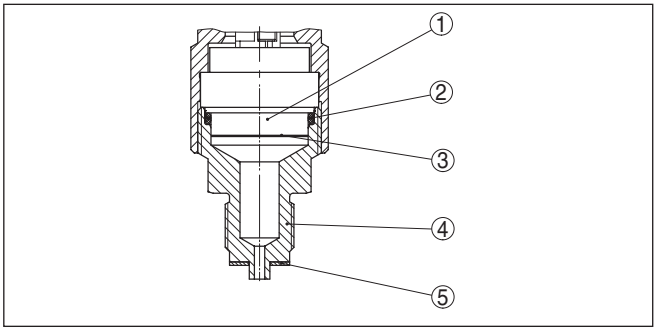

Fig. 3: Recessed installation of the CERTEC® measuring cell

1 Measuring cell
2 Seal for the measuring cell
3 Diaphragm
4 Process fitting
5 Seal for the process fitting

Front-flush mounting with single seal

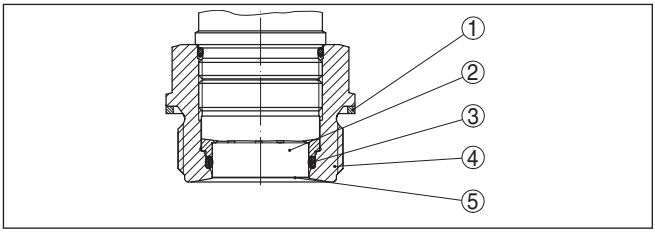

Fig. 4: Front-flish mounting of the CERTEC® measuring cell

1 Seal for the process fitting
2 Measuring cell
3 Seal for the measuring cell
4 Process fitting
5 Diaphragm

Front-flush mounting with double seal

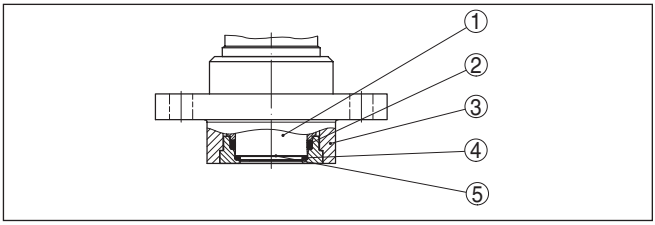

Fig. 5: Front-flush installation of the CERTEC® measuring cell with double seal

1 Measuring cell
2 Seal for the measuring cell
3 Process fitting
4 Additional, front seal for measuring cell
5 Diaphragm

Installation in hygienic fitting

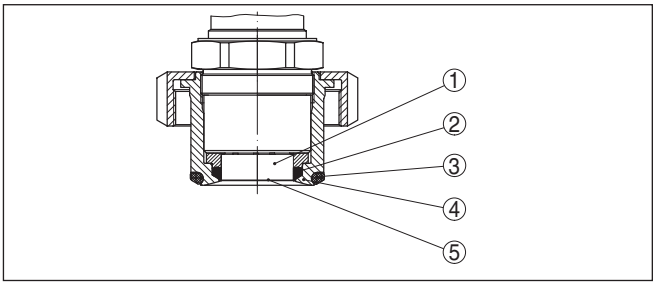

Fig. 6: Hygienic installation of the CERTEC® measuring cell

1 Measuring cell
2 Form seal for the measuring cell
3 Gap-free seal for process fitting
4 Process fitting
5 Diaphragm

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3.3 Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

3.4 Accessories and replacement parts

Protective cap

The protective cover protects the sensor housing against soiling and intense heat from solar radiation.

You will find additional information in the supplementary instructions manual "*Protective cover*" (Document-ID 34296).

Flanges

Screwed flanges are available in different versions according to the following standards: DIN 2501, EN 1092-1, BS 10, ANSI B 16.5, JIS B 2210-1984, GOST 12821-80.

You can find additional information in the supplementary instructions manual "*Flanges according to DIN-EN-ASME-JIS*" (Document-ID 31088).

Welded socket

Welded sockets are used to connect the sensors to the process.

You can find further information in the supplementary instructions "*Welded socket VEGABAR series 80*" (Document-ID 45082).

Electronics module

The electronics module VEGABAR series 80 is a replacement part for pressure transmitters of VEGABAR series 80. There is a different version available for each type of signal output.

You can find further information in the operating instructions "*Electronics module VEGABAR series 80*" (Document-ID 45054).

4 Mounting

4.1 General instructions to use the instrument

Suitability for the process conditions

Make sure that all parts of the instrument exposed to the process are suitable for the existing process conditions.

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions are particularly:

- Process pressure
- Process temperature
- Chemical properties of the medium
- Abrasion and mechanical influences

You can find the specifications of the process conditions in chapter "*Technical data*" as well as on the nameplate.

Protection against moisture

Protect your instrument further through the following measures against moisture penetration:

- Use the recommended cable (see chapter "*Connecting to power supply*")
- Tighten the cable gland
- Loop the connection cable downward in front of the cable gland

This applies particularly to:

- Outdoor mounting
- Installations in areas where high humidity is expected (e.g. through cleaning processes)
- Installations on cooled or heated vessels

Screwing in

On instruments with process fitting thread, the hexagon must be tightened with a suitable screwdriver. Wrench size see chapter "*Dimensions*".

Warning:
The housing must not be used to screw the instrument in! Applying tightening force can damage internal parts of the housing.

Vibrations

In case of strong vibrations at the mounting location, the instrument version with external housing should be used. See chapter "*External housing*".

Temperature limits

Higher process temperatures often mean also higher ambient temperatures. Make sure that the upper temperature limits stated in chapter "*Technical data*" for the environment of the electronics housing and connection cable are not exceeded.

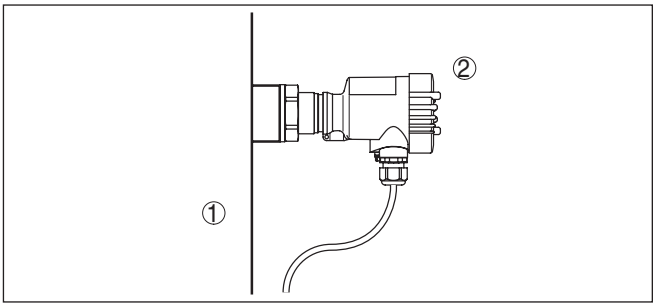

Fig. 7: Temperature ranges

1 Process temperature
2 Ambient temperature

4.2 Ventilation and pressure compensation

Filter elements

Ventilation and pressure compensation are carried out with VEGABAR 82 via a filter element. It is air permeable and moisture-blocking.

Caution:
The filter element causes a time-delayed pressure compensation. When quickly opening/closing the housing cover, the measured value can change for approx. 5 s by up to 15 mbar.

For effective ventilation, the filter element must always be free of buildup.

Caution:
Do not use a high-pressure cleaner. The filter element could be damaged, which would allow moisture into the housing.

The following paragraphs describe how the filter element is arranged in the different instrument versions.

Instruments in non-Ex and Ex-ia version

The filter element is mounted into the electronics housing. It has the following functions:

- Ventilation electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

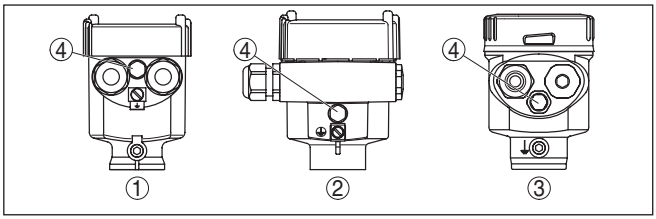

Fig. 8: Position of the filter element - non-Ex, Ex-ia version

1 Housing plastic, stainless steel precision casting
2 Housing aluminium
3 Housing stainless steel, electropolished
4 Filter element

With the following instruments a blind plug is installed instead of the filter element:

- Instruments in protection IP 66/IP 68 (1 bar) - ventilation via capillaries in fix connected cable
- Instruments with absolut pressure

Instruments in Ex-d version

The filter element is integrated in the process assembly. It is located in a rotatable metal ring and has the following functions:

- Atmospheric pressure compensation (with relative pressure measuring ranges)

Turn the metal ring in such a way that the filter element points downward after installtion of the instrument. This provides better protection against buildup.

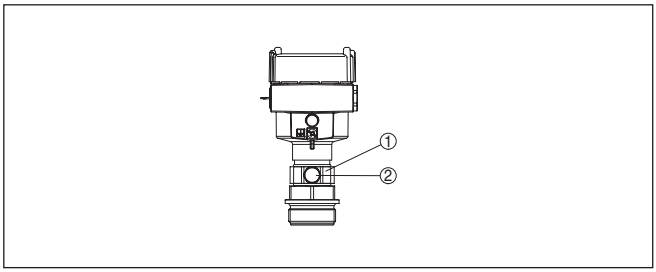

Fig. 9: Position of the filter element - Ex-d version

1 Single chamber housing, aluminium, stainless steel precision casting
2 Rotatable metal ring
3 Filter element

With absolute pressure measuring ranges, a blind plug is used instead of the filter element.

Instruments with Second Line of Defense

The filter element is mounted into the electronics housing. It has the following functions:

- Ventilation electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

The process assembly of instruments with Second Line of Defense (gastight leadthrough) is completely encapsulated. An absolute pressure measuring cell is used so that no ventilation is required.

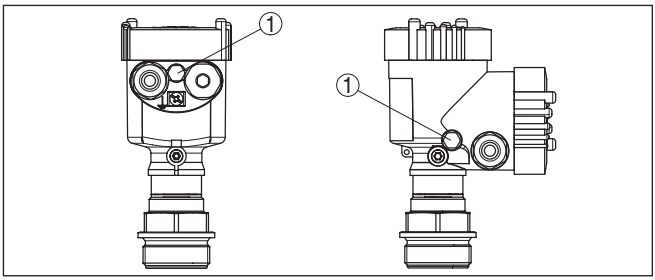

Fig. 10: Position of the filter element - gastight leadthrough

1 Filter element

With relative pressure measuring ranges, the ambient pressure is detected and compensated by a reference sensor in the electronics.

Instruments in IP 69K version

The filter element is mounted into the electronics housing. It has the following functions:

- Ventilation electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

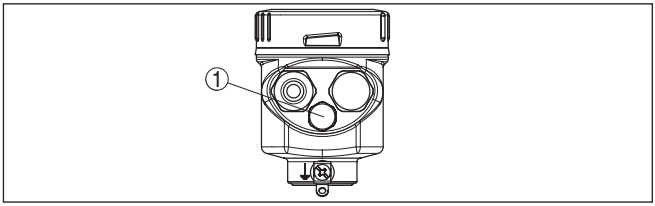

Fig. 11: Position of the filter element - IP 69K version

1 Filter element

Instruments with absolute pressure have a blind plug mounted instead of the filter element.

4.3 Combination Master - Slave

In principle, any sensor combination within the VEGABAR 80 series is allowed. The following requirements must be fulfilled:

- Configuration, Master sensor suitable for electronic differential pressure
- Pressure type is identical for both sensors, i.e. relative pressure/relative pressure or absolute pressure/absolute pressure
- The master sensor must always measure the higher pressure
- Measurement setup as shown in the following chapters

4.4 Level measurement

Measurement setup

The master/slave combination is suitable for level measurement in a pressurized vessel

Keep the following in mind when setting up the measuring system:

- Mount the master sensor below the min. level
- Do not mount the master sensor close to the filling stream or emptying area
- Mount the master sensor so that it is protected against pressure shocks from the stirrer
- Mount the slave sensor above the max. level

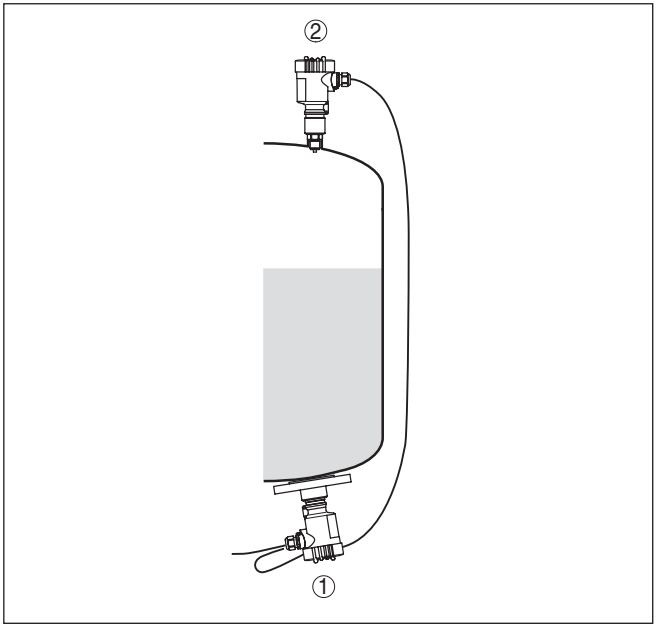

Fig. 12: Measurement setup, level measurement in pressurized vessel

1 VEGABAR 82
1 VEGABAR 82 - Slave sensor

4.5 Differential pressure measurement

Measurement setup

The master/slave combination is suitable for differential pressure measurement

Take note of the following instructions for the measurement setup, for example in gases:

- Mount the instruments above the measuring point

Possible condensation can then drain off into the process line.

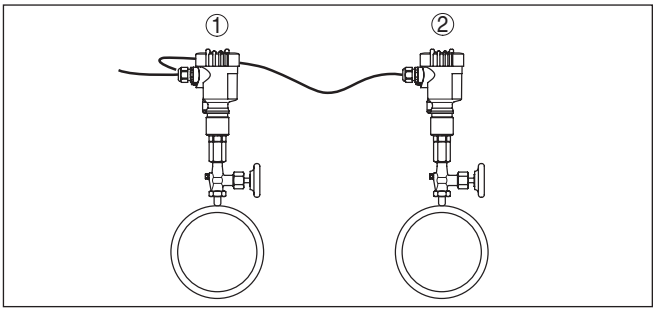

Fig. 13: Measurement setup for differential pressure measurement of gases in pipelines

1 VEGABAR 82
1 VEGABAR 82 - Slave sensor

4.6 Interface measurement

Measurement setup

The master/slave combination is suitable for interface measurement

Requirements for a functioning measurement are:

- Vessel with changing level
- Products with steady densities
- Interface always between the measurement points
- Total level always above the upper measurement point

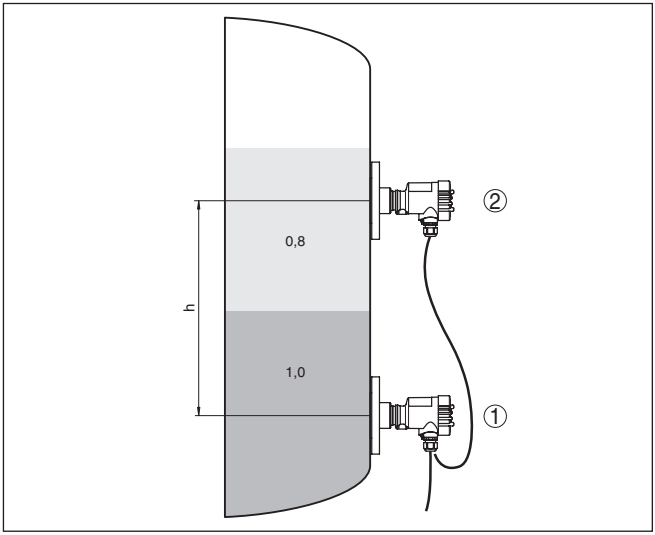

Fig. 14: Measurement setup with interface measurement, h = distance between the two measuring points

1 VEGABAR 82
2 VEGABAR 82 - Slave sensor

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The interface measurement is possible in open as well as in closed vessels.

4.7 Density measurement

Measurement setup

The master/slave combination is suitable for density measurement.

Requirements for a functioning measurement are:

- Vessel with changing level
- Product with consistent density
- Distance between the measurement points as large as possible
- Level always above the upper measuring point

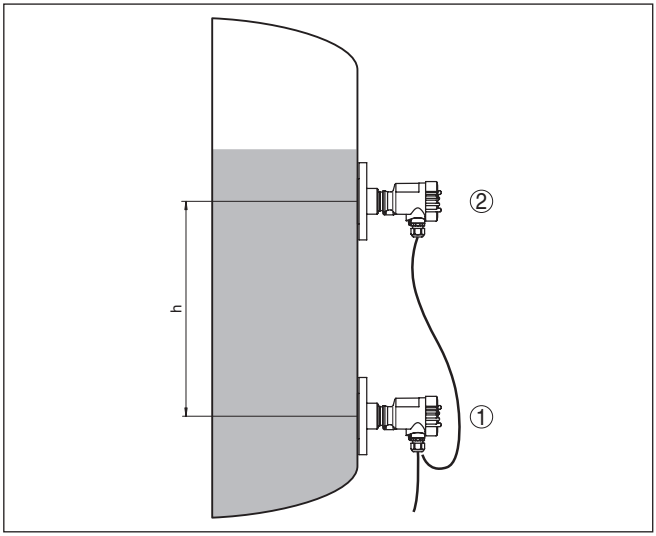


Fig. 15: Measurement setup with density measurement, h = distance between the two measuring points

1 VEGABAR 82
2 VEGABAR 82 - Slave sensor

Density measurement is possible in open as well as in closed vessels. Small changes in the density cause only small changes in the measured differential pressure. So a suitable measuring range has to be selected.

4.8 External housing

Configuration

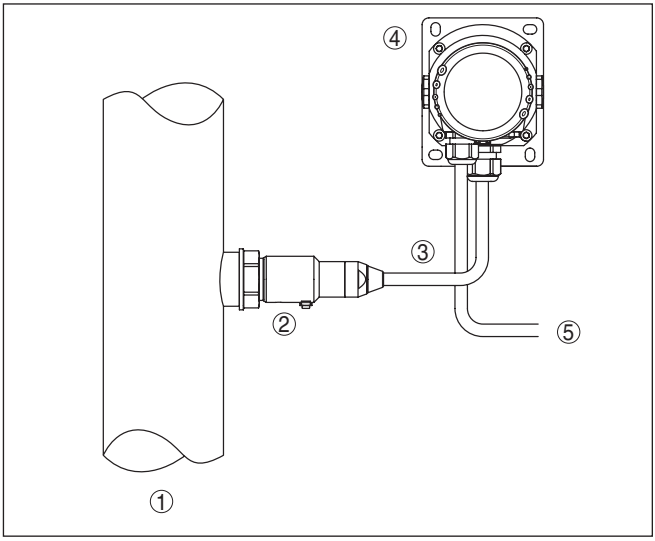


Fig. 16: Setup process assembly, external housing

1 Process assembly
2 Connection cable process assembly - External housing
3 External housing
4 Signal cable

Mounting

1. Mark the holes according to the following drilling template
2. Fasten wall mounting plate with 4 screws

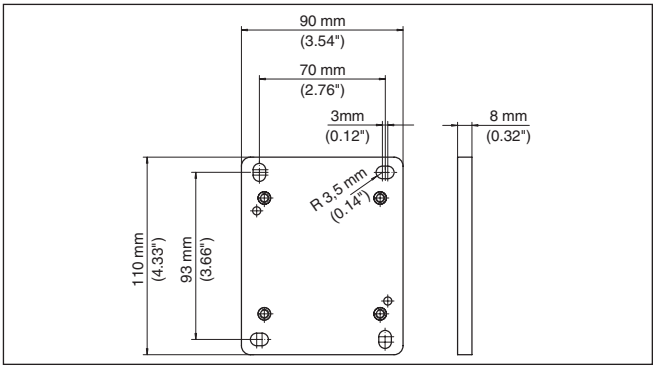


Fig. 17: Drilling template - wall mounting plate

5 Connecting to power supply

5.1 Preparing the connection

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

Voltage supply

The voltage supply and the signal transmission are carried out via the four-wire, screened connection cable from the master sensor.

You can find the data for this signal circuit in chapter "*Technical data*".

Cable gland ½ NPT

With plastic housing, the NPT cable gland or the Conduit steel tube must be screwed without grease into the threaded insert.

Max. torque for all housings see chapter "*Technical data*".

5.2 Connecting

Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

The connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.

Information:
The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When reinserting the terminal block, you should hear it snap in.

Connection procedure

Proceed as follows:

1. Unscrew the housing cover
2. If a display and adjustment module is installed, remove it by turning it slightly to the left.
3. Loosen compression nut of the cable entry
4. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
5. Insert the cable into the sensor through the cable entry

Fig. 18: Connection steps 5 and 6

6. Insert the wire ends into the terminals according to the wiring plan

Information:
Solid cores as well as flexible cores with wire end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal from above with a small screwdriver; the terminal opening is freed. When the screwdriver is released, the terminal closes again.

You can find further information on the max. wire cross-section under "*Technical data/Electromechanical data*"

7. Check the hold of the wires in the terminals by lightly pulling on them
8. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
9. Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
10. Reinsert the display and adjustment module, if one was installed
11. Screw the housing cover back on

The electrical connection is hence finished.

5.3 Single chamber housing

The following illustration applies to the non-Ex, Ex-ia and Ex-d version.

Electronics and connection compartment

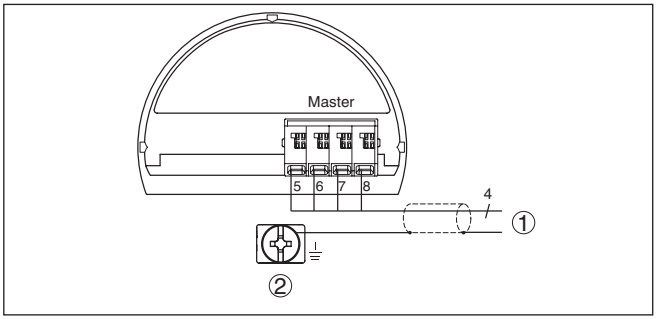


Fig. 19: Wiring plan VEGABAR 82 Slave sensor

1 To the sensor
2 Ground terminal for connection of the cable screen[1)]

5.4 External housing with version IP 68 (25 bar)

Overview

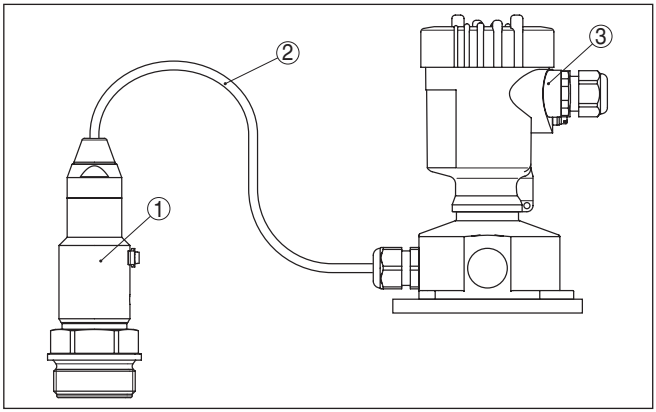


Fig. 20: VEGABAR 82 in IP 68 version 25 bar with axial cable outlet, external housing

1 Transmitter
2 Connection cable
3 External housing

[1)] Connect screen here. Connect ground terminal on the outside of the housing to ground as prescribed. The two terminals are galvanically connected.

Electronics and connection compartment for power supply

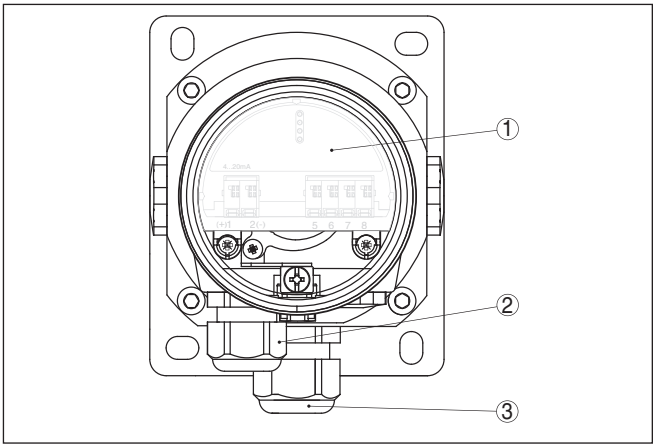


Fig. 21: Electronics and connection compartment

1 *Electronics module*
2 *Cable gland for voltage supply*
3 *Cable gland for connection cable, transmitter*

Terminal compartment, housing socket

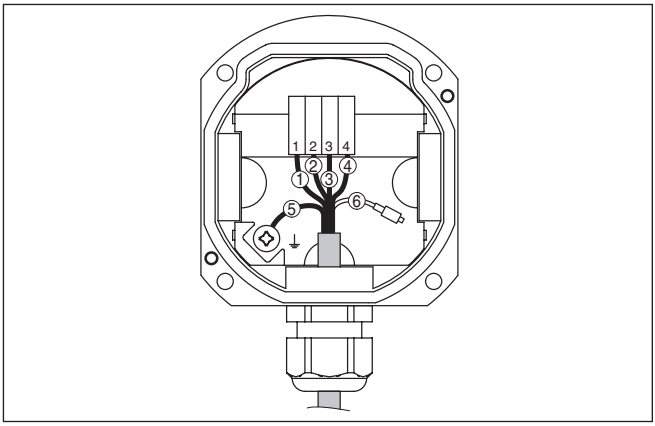


Fig. 22: Connection of the sensor in the housing base

1 *Yellow*
2 *White*
3 *Red*
4 *Black*
5 *Shielding*
6 *Breather capillaries*

Electronics and connection compartment

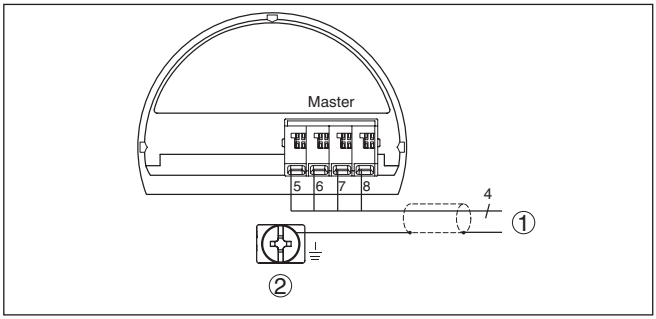


Fig. 23: Wiring plan VEGABAR 82 Slave sensor

1 To the sensor
2 Ground terminal for connection of the cable screen[2)]

5.5 Connection example

Connection example, slave sensor

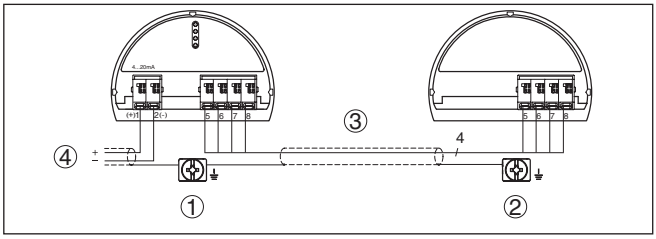


Fig. 24: Connection example VEGABAR 82 slave sensor

1 VEGABAR 82
2 VEGABAR 82 slave sensor
3 Connection cable
4 Supply and signal circuit VEGABAR 82

The connection between VEGABAR 82 and the VEGABAR 82 slave sensor is made with a standard cable according to the chart:

VEGABAR 82	Slave sensor
Terminal 5	Terminal 5
Terminal 6	Terminal 6
Terminal 7	Terminal 7
Terminal 8	Terminal 8

[2)] Connect screen here. Connect ground terminal on the outside of the housing to ground as prescribed. The two terminals are galvanically connected.

6 Set up with the display and adjustment module

6.1 Parameter adjustment - Quick setup

To quickly and easily adapt the sensor to the application, select the menu item "*Quick setup*" in the start graphic on the display and adjustment module.

Carry out the following steps in the sequence specified below. The presettings apply to all applications.

You can find "*Extended adjustment*" in the next sub-chapter.

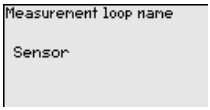
Presettings

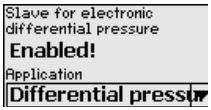
1. Measurement loop name
In the first menu item you assign a suitable measurement loop name. Permitted are names with max. 19 characters.

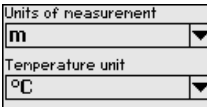
2. Application
In this menu item you activate/deactivate the slave sensor for electronic differential pressure and select the application.

Note:
It is absolutely necessary to activate the slave sensor in advance to have the applications displayed in the electronic differential pressure measurement menus.

3. Units
In this menu item you determine the adjustment and temperature units of the instrument. Depending on the selected application in the menu item "*Application*", different adjustment units are available.







Quick setup - Level measurement

4. Unit, static pressure
In this menu item, you determine the unit of the static, i.e. superimposed pressure.

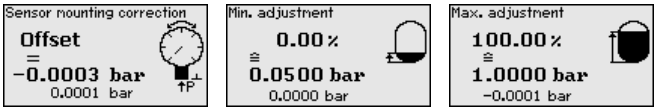
5. Position correction
In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

6. Min. adjustment
In this menu item you carry out the min. adjustment for level.

Enter the percentage value and the corresponding pressure value for the min. level.

7. Max. adjustment
In this menu item you carry out the max. adjustment for level.

Enter the percentage value and the corresponding pressure value for the max. level.



The quick setup for level measurement is finished.

Quick setup - Flow measurement

4. Position correction
In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

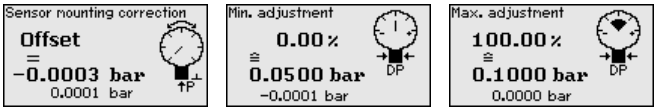
5. Min. adjustment
In this menu item you carry out the min. adjustment for flow.

Enter the percentage value and the corresponding pressure value for the min. flow.

6. Max. adjustment
In this menu item you carry out the max. adjustment for flow.

Enter the percentage value and the corresponding pressure value for the max. flow.

7. Linearization
In this menu item, you select the characterics of the output signal.



The quick setup for flow measurement is finished.

Quick setup - Differential pressure measurement

4. Unit, static pressure
In this menu item, you determine the unit of the static, i.e. superimposed pressure.

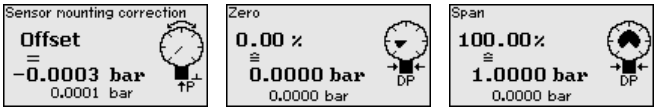
5. Position correction
In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

6. zero adjustment
In this menu item you carry out the zero adjustment for the differential pressure.

Enter the respective pressure value for 0 %.

7. span adjustment
In this menu item you carry out the span adjustment for the differential pressure

Enter the respective pressure value for 100 %.



The quick setup for differential pressure measurement is finished.

Quick setup - Density measurement

4. Unit, static pressure
In this menu item, you determine the unit of the static, i.e. superimposed pressure.

5. Position correction
In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

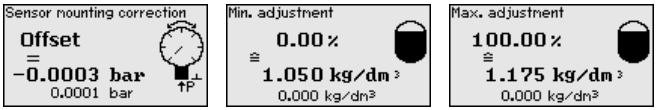
6. Distance
In this menu item, you enter the installation distance between master and slave sensor.

7. Min. adjustment
In this menu item you carry out the min. adjustment for density.

Enter the percentage value and the corresponding density value for the min. density.

8. Max. adjustment
In this menu item you carry out the max. adjustment for density.

Enter the percentage value and the corresponding density value for the max. density.



The quick setup for density measurement is finished.

Quick setup - Interface measurement

4. Unit, static pressure
In this menu item, you determine the unit of the static, i.e. superimposed pressure.

5. Position correction
In this menu item you compensate the influence of the installation position of the instrument (offset) to the measured value.

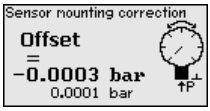
6. Distance
In this menu item, you enter the installation distance between master and slave sensor.

7. Min. adjustment
In this menu item, you carry out the adjustment for the min. height of the interface.

Enter the percentage value and the corresponding height of the interface.

8. Max. adjustment
In this menu item, you carry out the adjustment for the max. height of the interface.

Enter the percentage value and the corresponding height of the interface.



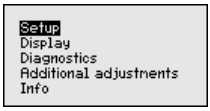
The quick setup for interface measurement is finished.

6.2 Parameter adjustment - Extended adjustment

For technically demanding measurement loops you can carry out extended settings in "*Extended adjustment*".

Main menu

The main menu is divided into five sections with the following functions:



Setup: Settings, e.g., for measurement loop name, application, units, position correction, adjustment, signal output

Display: Settings, e.g., for language, measured value display, lighting

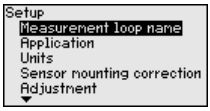
Diagnosis: Information, e.g. on instrument status, pointer, measurement reliability, simulation

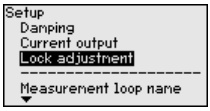
Additional adjustments: PIN, date/time, reset, copy function

Info: Instrument name, hardware and software version, date of manufacture, sensor features

In the main menu item "*Setup*", the individual submenu items should be selected one after the other and provided with the correct parameter values.

The following submenu points are available:





In the following section, the menu items from the menu "*Setup*" for electronic differential pressure measurement are described in detail. Depending on the selected application, different sections are relevant.

Information:
Further menu items of the menu "*Setup*" as well as the complete menus "*Display*", "*Diagnosis*", "*Additional adjustments*" and "*Info*" are described in the operating instructions of the respective master sensor.

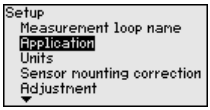
Setup - Application

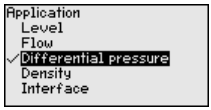
In this menu item you activate/deactivate the slave sensor for electronic differential pressure and select the application.

The following applications are available:

- Level
- Flow
- Differential pressure
- Density
- Interface

Note:
It is absolutely necessary to activate the slave sensor in advance to have the applications displayed in the electronic differential pressure measurement menus.

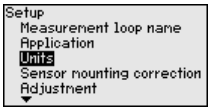


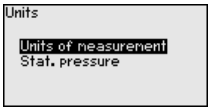


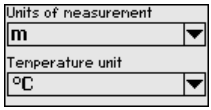
Enter the requested parameters via the appropriate keys, save your settings with ***[OK]*** and jump to the next menu item with the ***[ESC]*** and the ***[->]*** key.

Setup - Units

In this menu item, you determine the units for the "*Min. adjustment/zero*" and "*Max. adjustment/span*" as well as the static pressure.







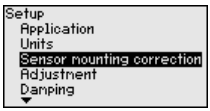
If the level should be adjusted in a height unit, the density of the medium must also be entered later during the adjustment.

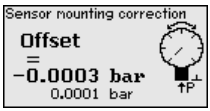
In addition, the unit for the measuring cell and electronics temperature is determined in the menu item "*Peak values*".

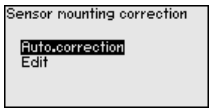
Enter the requested parameters via the appropriate keys, save your settings with ***[OK]*** and jump to the next menu item with the ***[ESC]*** and the ***[->]*** key.

Setup - Position correction

Particularly with chemical seal systems, the installation position of the instrument can shift the measured value (offset). The position correction compensates this offset. Hence the actual measured value is accepted automatically. With relative pressure measuring cells also a manual offset can be carried out. With a master/slave combination, the position correction is carried out for both sensors.







If the actual measured value should be taken over as correction value during automatic position correction, this value must not be influenced by product coverage or static pressure.

With the manual position correction, the offset value can be determined by the user. Select for this purpose the function "*Edit*" and enter the requested value.

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Save your settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the next menu item.

After the position correction is carried out, the actual measured value is corrected to 0. The corrective value appears with an inverse sign as offset value in the display.

The position correction can be repeated as often as necessary. However, if the sum of the corrective values exceeds 20 % of the nominal measuring range, then no position correction is possible.

Setup - Adjustment

VEGABAR 82 always measures pressure independently of the process variable selected in the menu item "*Application*". To output the selected process variable correctly, an allocation to 0 % and 100 % of the output signal must be carried out (adjustment).

With the application "*Level*", the hydrostatic pressure, e.g. with full and empty vessel, is entered for adjustment. A superimposed pressure is detected by the slave sensor and automatically compensated. See the following example:

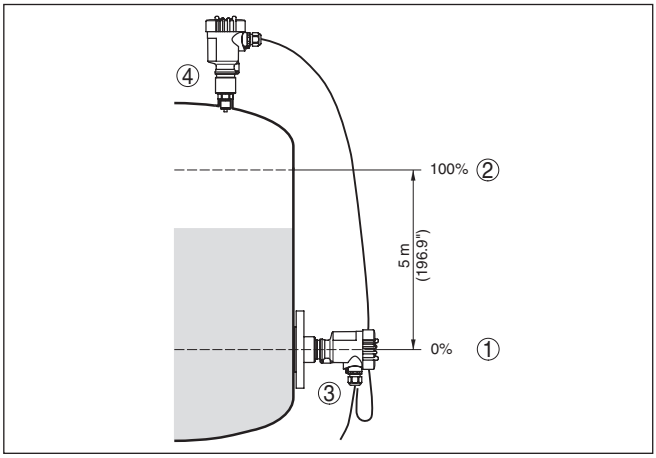


Fig. 25: Parameter adjustment example "Min./max. adjustment, level measurement"

1 Min. level = 0 % corresponds to 0.0 mbar
2 Max. level = 100 % corresponds to 490.5 mbar
3 VEGABAR 82
4 VEGABAR 82 - Slave sensor

If these values are not known, an adjustment with levels of for example 10 % and 90 % is also possible. By means of these settings, the real filling height is then calculated.

The real product level during this adjustment is not important, because the min./max. adjustment is always carried out without changing the product level. These settings can be made ahead of time without the instrument having to be installed.

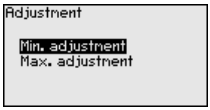
Note:
If the adjustment ranges are exceeded, the entered value will not be accepted. Editing can be interrupted with ***[ESC]*** or corrected to a value within the adjustment ranges.

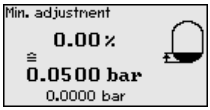
For the other process variables such as e.g. process pressure, differential pressure or flow, the adjustment is performed in like manner.

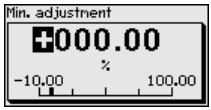
Setup - Min. adjustment Level

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Adjustment*", then "*Min. adjustment*" and confirm with ***[OK]***.







2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value (e.g. 10 %) with ***[+]*** and save with ***[OK]***. The cursor jumps now to the pressure value.
4. Enter the pressure value corresponding to the min. level (e.g. 0 mbar).
5. Save settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the max. adjustment.

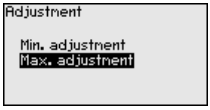
The min. adjustment is finished.

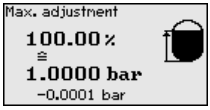
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

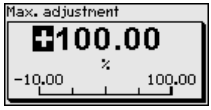
Setup - Max. adjustment Level

Proceed as follows:

1. Select with ***[->]*** the menu item "Max. adjustment" and confirm with ***[OK]***.







2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value (e.g. 90 %) with ***[+]*** and save with ***[OK]***. The cursor jumps now to the pressure value.
4. Enter the pressure value for the full vessel (e.g. 900 mbar) corresponding to the percentage value.
5. Save settings with ***[OK]***

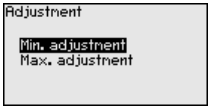
The max. adjustment is finished.

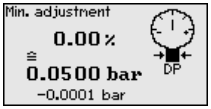
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

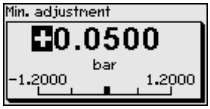
Setup - Min. adjustment, flow

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Min. adjustment*" and confirm with ***[OK]***.







2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.
4. Change with ***[ESC]*** and ***[->]*** to the span adjustment

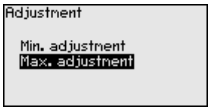
The min. adjustment is finished.

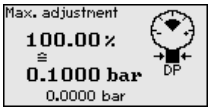
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

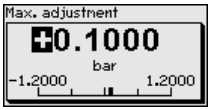
Setup - Max. adjustment, flow

Proceed as follows:

1. Select with ***[->]*** the menu item "Max. adjustment" and confirm with ***[OK]***.







2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.

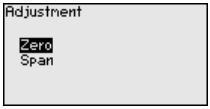
The max. adjustment is finished.

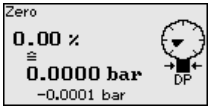
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

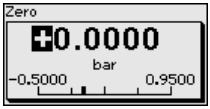
Setup - zero adjustment, differential pressure

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*zero adjustment*" and confirm with ***[OK]***.







2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.
4. Change with ***[ESC]*** and ***[->]*** to the span adjustment

The zero adjustment is finished.

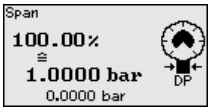
Information:
The zero adjustment shifts the value of the span adjustment. The span, i.e. the difference between these values, however, remains unchanged.

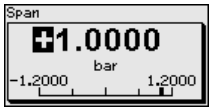
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

Setup - span adjustment, differential pressure

Proceed as follows:

1. Select with ***[->]*** the menu item "Span adjustment" and confirm with ***[OK]***.





2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.

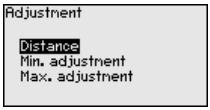
The span adjustment is finished.

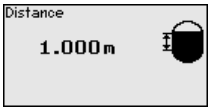
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

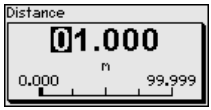
Setup - Distance, density

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Distance*" and confirm with ***[OK]***.







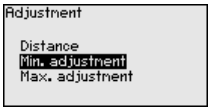
2. Edit the sensor distance with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested distance with ***[+]*** and store with ***[OK]***.

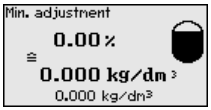
The adjustment of the distance is hence finished.

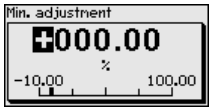
Setup - Min. adjustment, density

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Min. adjustment*" and confirm with ***[OK]***.







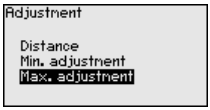
2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the density value.
4. Enter the min. distance suitable for the percentage value.
5. Save settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the max. adjustment.

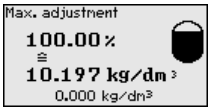
The min. adjustment for density is finished.

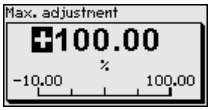
Setup - Max. adjustment, density

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Max. adjustment*" and confirm with ***[OK]***.







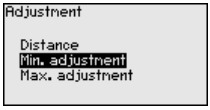
2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the density value.
4. Enter the max. density value matching the percentage value.

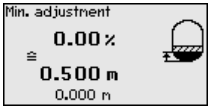
The max. adjustment for density is finished.

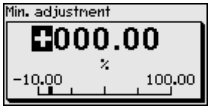
Setup - Min. adjustment - Interface

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Min. adjustment*" and confirm with ***[OK]***.







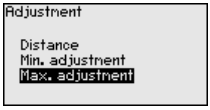
2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the height value.
4. Enter the min. height of the interface suitable for the percentage value.
5. Save settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the max. adjustment.

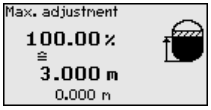
The min. adjustment, interface is hence finished.

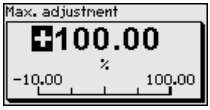
Setup - Max. adjustment - Interface

Proceed as follows:

1. Select the menu item "*Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item "*Max. adjustment*" and confirm with ***[OK]***.





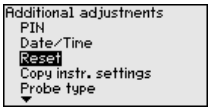


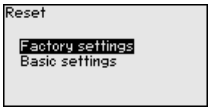
2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the height value.
4. Enter the max. height of the interface matching the percentage value.

The max. adjustment for interface is finished.

Additional adjustments - Reset

With a reset, certain parameter adjustments carried out by the user are reset.





The following reset functions are available:

Delivery status: Restoring the parameter settings at the time of shipment from the factory incl. the order-specific settings. A user-programmable linearization curve as well as the measured value memory will be deleted.

Basic settings: Resetting the parameter settings incl. special parameters to the default values of the respective instrument. A user programmable linearization curve as well as the measured value memory is deleted.

The following table shows the default values of the instrument. Depending on the instrument version or application, all menu items may not be available or some may be differently assigned:

Reset - Setup

Menu item	Parameter	Default value
Measurement loop name		Sensor
Application	Slave for electronic differential pressure	No reset
	Application	No reset
Units	Unit of measurement	mbar (with nominal measuring range ≤400 mbar) bar (with nominal measuring ranges ≥1 bar)
	Static pressure	bar
Position correction		0.00 bar
Adjustment	Distance (with density and interface)	1.00 m
	Zero/Min. adjustment	0.00 bar 0.00 %
	Span/Max. adjustment	Nominal measuring range in bar 100.00 %
Damping	Integration time	0.0 s
Linearization		Linear

Menu item	Parameter	Default value
Current output	Current output - Mode	Output characteristics 4 … 20 mA Reaction when malfunction occurs ≤ 3.6 mA
	Current output - Min./Max.	3.8 mA 20.5 mA
Lock adjustment		Last setting

Reset - Display

Menu item	Default value
Menu language	Order-specific
Displayed value 1	Current output in %
Displayed value 2	Measuring cell temperature in °C
Backlight	Switched off

Reset - Diagnosis

Menu item	Parameter	Default value
Sensor status		-
Peak value	Pressure	Actual measured value
	Temperature	Actual temperature values from measuring cell, electronics
Simulation		-

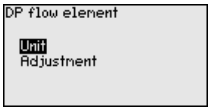
Reset - Additional settings

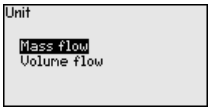
Menu item	Parameter	Default value
PIN		0000
Date/Time		Actual date/Actual time
Copy instrument settings		-
Special parameters		No reset
Scaling	Scaling size	Volume in l
	Scaling format	0 % corresponds to 0 l 100 % corresponds to 0 l
Current output	Current output - Size	Lin. percent - Level
	Current output - adjustment	0 … 100 % correspond to 4 … 20 mA
HART mode		Address 0

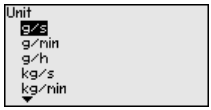
Menu item	Parameter	Default value
Effective pressure transmitter	Unit	m^3/s
	Adjustment	0.00 % correspond to 0.00 m^3/s 100.00 %, 1 m^3/s

Setup - Characteristics values, effective pressure transmitter

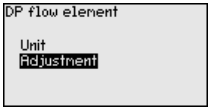
In this menu item, the units for the effective pressure transmitter are determined as well as the selection of mass or volume flow.

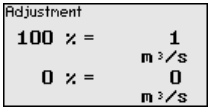






Furthermore the adjustment for the volume or mass flow rate at 0 % or 100 % is carried out.





7 Diagnosis, asset management and service

7.1 Maintenance

Maintenance

If the instrument is used properly, no special maintenance is required in normal operation.

In some applications, product buildup on the diaphragm can influence the measuring result. Depending on the sensor and application, take precautions to ensure that heavy buildup, and especially a hardening thereof, is avoided.

7.2 Rectify faults

Reaction when malfunctions occur

The operator of the system is responsible for taking suitable measures to rectify faults.

Procedure for fault rectification

The first measures are:

- Evaluation of fault messages, for example via the display and adjustment module
- Checking the output signal
- Treatment of measurement errors

Further comprehensive diagnostics options are available with a PC with PACTware and the suitable DTM. In many cases, the reasons can be determined in this way and faults rectified.

Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Setup*" must be carried out again or must be checked for plausibility and completeness.

24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is also available outside normal working hours, seven days a week around the clock.

Since we offer this service worldwide, the support is provided in English. The service itself is free of charge, the only costs involved are the normal call charges.

7.3 Exchanging the electronics module

In case of a defect, the user can replace the electronics module with another one of identical type.

In Ex applications, only instruments and electronics modules with appropriate Ex approval may be used.

If there is no electronics module available on site, one can be ordered from the agency serving you.

7.4 Exchange process assembly with version IP 68 (25 bar)

With version IP 68 (25 bar), the user can exchange the process assembly on site. Connection cable and external housing can be kept.

Required tools:

- Hexagon socket wrench, size 2

Caution:
The exchange may only be carried out in the complete absence of line voltage.

In Ex applications, only a replacement part with appropriate Ex approval may be used.

Proceed as follows when carrying out the exchange:

1. Losen the fixing screw with the hexagon socket wrench
2. Carefully detach the cable assembly from the process assembly

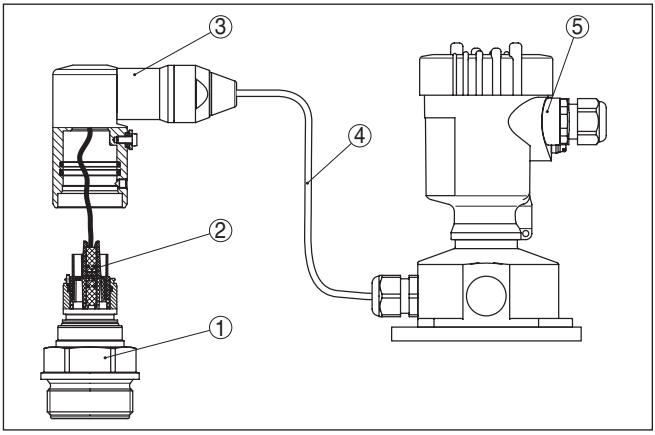


Fig. 26: VEGABAR 82 in IP 68 version, 25 bar and lateral cable outlet, external housing

1 Process assembly
2 Plug connector
3 Cable assembly
4 Connection cable
5 External housing

3. Loosen the plug connector
4. Mount the new process assembly on the measuring point
5. Plug the connector back in
6. Mount the cable assembly on the process assembly and turn it to the desired position
7. Tighten the fixing screw with the hexagon socket wrench

The exchange is finished.

If there is no replacement part available on site, one can be ordered from the agency serving you.

The necessary serial number can be found on the type label of the instrument or on the delivery note.

7.5 How to proceed in case of repair

You can find a repair form as well as detailed information on how to proceed under www.vega.com/downloads and "*Forms and certificates*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

If a repair is necessary, please proceed as follows:

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please contact the agency serving you to get the address for the return shipment. You can find the agency on our home page www.vega.com.

8 Dismounting

8.1 Dismounting steps

Warning:
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel or pipeline, high temperatures, corrosive or toxic products etc.

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

8.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the parts to be easily separable.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

9 Supplement

9.1 Technical data

Materials and weights

Materials, wetted parts	
Process fitting	316L, PVDF, Alloy C-22, Alloy C-276, Duplex 1.4462, Titanium Grade 2
Diaphragm	Sapphire-ceramic® (> 99.9 % Al_2O_3 ceramic)
Joining material diaphragm/Basic element measuring cell	Glass (with double and form seal, non-wetted parts)
Measuring cell seal	FKM (VP2/A, A+P 70.16), EPDM (A+P 75.5/KW75F), FFKM (Kalrez 6375, Perlast G75S, Perlast G75B)
Seal for process fitting (in the scope of delivery)	
– Thread G½ (EN 837)	Klingersil C-4400
– Thread G1½ (DIN 3852-A)	Klingersil C-4400
– M44 x 1.25 (DIN 13), M30 x 1.5	FKM, FFKM, EPDM
Materials for applications in foodstuffs	
Surface quality hygienic fittings, typ.	R_a < 0.8 µm
Seal below wall mounting plage 316L with 3A approval	EPDM
Materials, non-wetted parts	
Electronics housing	Plastic PBT (polyester), Alu die-casting powder-coated, 316L
External housing	plastic PBT (Polyester), 316L
Socket, wall mounting plate external housing	plastic PBT (Polyester), 316L
Seal between base and wall mounting plate	EPDM (fixed connected)
Seal, housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
Inspection window in housing cover for display and adjustment module	Polycarbonate (UL-746-C listed)
Ground terminal	316Ti/316L
Connection cable between transmitter and external electronics housing with IP 68 (25 bar) version	PE, PUR
Type label support on connection cable	PE hard
Connection cable with IP 68 (1 bar) version	PE
Weights	
Total weight VEGABAR 82 approx.	0.8 … 8 kg (1.764 … 17.64 lbs), depending on process fitting and housing

Input variable

Adjustment

Adjustment range of the min./max. adjustment relating to the nominal measuring range:

- Percentage value -10 … 110 %
- Pressure value -20 … 120 %

Adjustment range of the zero/span adjustment relating to the nominal measuring range:

- zero -20 … +95 %
- span -120 … +120 %[3)]
- Difference between zero and span max. 120 % of the nominal range

Recommended max. turn down 20 : 1 (no limitation)

Nominal measuring ranges and overload capability in bar/kPa

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting as well as the selected pressure type are possible. The specifications on the nameplate apply.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … +0.025 bar/0 … +2.5 kPa (only for measuring cell ø 28 mm)	+5 bar/+500 kPa	-0.05 bar/-5 kPa
0 … +0.1 bar/0 … +10 kPa	+15 bar/+1500 kPa	-0.2 bar/-20 kPa
0 … +0.4 bar/0 … +40 kPa	+30 bar/+3000 kPa	-0.8 bar/-80 kPa
0 … +1 bar/0 … +100 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
0 … +2.5 bar/0 … +250 kPa	+50 bar/+5000 kPa	-1 bar/-100 kPa
0 … +10 bar/0 … +1000 kPa	+90 bar/+9000 kPa	-1 bar/-100 kPa
0 … +25 bar/0 … +2500 kPa	+130 bar/+13000 kPa	-1 bar/-100 kPa
0 … +60 bar/0 … +6000 kPa	+200 bar/+20000 kPa	-1 bar/-100 kPa
0 … +100 bar/0 … +10000 kPa (only for measuring cell ø 28 mm)	+200 bar/+20000 kPa	-1 bar/-100 kPa
-1 … 0 bar/-100 … 0 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
-1 … +1.5 bar/-100 … +150 kPa	+40 bar/+4000 kPa	-1 bar/-100 kPa
-1 … +10 bar/-100 … +1000 kPa	+90 bar/+9000 kPa	-1 bar/-100 kPa
-1 … +25 bar/-100 … +2500 kPa	+130 bar/+13000 kPa	-1 bar/-100 kPa
-1 … +60 bar/-100 … +6000 kPa	+200 bar/+20000 kPa	-1 bar/-100 kPa
-1 … +100 bar/-100 … +10000 kPa (only for measuring cell ø 28 mm)	+200 bar/+20000 kPa	-1 bar/-100 kPa
-0.05 … +0.05 bar/-5 … +5 kPa	+15 bar/+1500 kPa	-0.2 bar/-20 kPa
-0.2 … +0.2 bar/-20 … +20 kPa	+20 bar/+2000 kPa	-0.4 bar/-40 kPa
-0.5 … +0.5 bar/-50 … +50 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
Absolute pressure		

[3)] Values less than -1 bar cannot be set.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
0 … 0.1 bar/0 … 10 kPa	15 bar/1500 kPa	0.8 bar abs.
0 … 1 bar/0 … 100 kPa	35 bar/3500 kPa	0 bar abs.
0 … 2.5 bar/0 … 250 kPa	50 bar/5000 kPa	0 bar abs.
0 … 10 bar/0 … 1000 kPa	90 bar/9000 kPa	0 bar abs.
0 … 25 bar/0 … 2500 kPa	130 bar/13000 kPa	0 bar abs.
0 … 60 bar/0 … 6000 kPa	200 bar/20000 kPa	0 bar abs.
0 … +100 bar/0 … +10000 kPa (only for measuring cell ø 28 mm)	200 bar/20000 kPa	0 bar abs.

Nominal measuring ranges and overload capacity in psi

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting as well as the selected pressure type are possible. The specifications on the nameplate apply.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … +0.4 psig (only for measuring cell ø 28 mm)	+75 psig	-0.725 psig
0 … +1.5 psig	+225 psig	-2.901 psig
0 … +5 psig	+435 psig	-11.60 psig
0 … +15 psig	+510 psig	-14.51 psig
0 … +30 psig	+725 psig	-14.51 psig
0 … +150 psig	+1300 psig	-14.51 psig
0 … +300 psig	+1900 psig	-14.51 psig
0 … +900 psig	+2900 psig	-14.51 psig
0 … +1500 psig (only for measuring cell ø 28 mm)	+2900 psig	-14.51 psig
-14.5 … 0 psig	+510 psig	-14.51 psig
-14.5 … +20 psig	+580 psig	-14.51 psig
-14.5 … +150 psig	+1300 psig	-14.51 psig
-14.5 … +300 psig	+1900 psig	-14.51 psig
-14.5 … +900 psig	+2900 psig	-14.51 psig
-14.5 … +1500 psig (only for measuring cell ø 28 mm)	+2900 psig	-14.51 psig
-0.7 … +0.7 psig	+225 psig	-2.901 psig
-3 … +3 psig	+290 psi	-5.800 psig
-7 … +7 psig	+510 psig	-14.51 psig
Absolute pressure		
0 … 1.5 psi	225 psig	0 psi

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
0 … 5 psi	435 psi	0 psi
0 … 15 psi	510 psi	0 psi
0 … 30 psi	725 psi	0 psi
0 … 150 psi	1300 psi	0 psi
0 … 300 psi	1900 psi	0 psi
0 … 900 psi	2900 psi	0 psi
0 … +1450 psig (only for measuring cell ø 28 mm)	2900 psig	0 psi

Reference conditions and actuating variables (according to DIN EN 60770-1)

Reference conditions according to DIN EN 61298-1

- Temperature: +15 … +25 °C (+59 … +77 °F)
- Relative humidity: 45 … 75 %
- Air pressure: 860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psig)

Determination of characteristics: Limit point adjustment according to IEC 61298-2

Characterstic curve: Linear

Reference installation position: upright, diaphragm points downward

Influence of the installation position: < 0.2 mbar/20 Pa (0.003 psig)

Deviation (according to IEC 60770)

Specifications refer to the set span. Turn down (TD) is the ratio: nominal measuring range/set span.

Accuracy class	Non-linearity, hysteresis and repeatability with TD 1 : 1 up to 5 : 1	Non-linearity, hysteresis and repeatability with 5 : 1
0.05 %	< 0.05 %	< 0.01 % x TD
0.1 %	< 0.1 %	< 0.02 % x TD
0.2 %	< 0.2 %	< 0.04 % x TD

Influence of the product or ambient temperature

Thermal change zero signal and output span

Turn down (TD) is the relation nominal measuring range/adjusted span.

Measuring cell - Standard

Medium or ambient temperature T	Accuracy class 0.05 %, 0.1 %	Accuracy class 0.2 %	Accuracy class 0.2 % with measuring range 0.1 bar_{abs}
-40 … 0 °C (-40 … +32 °F)	< {0.15 % + 0.015 %/K x (-T)} x {0.5+0.5 x TD}	< {0.1 % + 0.03 %/K x (-T)} x {0.5+0.5 x TD}	< {0.30 % + 0.03 %/K x (-T)} x {0.5+0.5 x TD}
0 … 40 °C (+32 … +104 °F)	< {0.0075 %/K x (T - 20 °C)} x {0.5+0.5 x TD}	< {0.005 %/K x (T - 20 °C)} x {0.5+0.5 x TD}	< {0.015 %/K x (T - 20 °C)} x {0.5+0.5 x TD}
40 … 100 °C (+104 … +212 °F)	< {0.15 % } x {0.5+0.5 x TD}	< {0.005 %/K x (T - 20 °C)} x {0.5+0.5 x TD}	< {0.3 % } x {0.5+0.5 x TD}

Medium or ambient temperature T	Accuracy class 0.05 %, 0.1 %	Accuracy class 0.2 %	Accuracy class 0.2 % with measuring range 0.1 bar_{abs}
100 … 130 °C (+212 … +266 °F)	< {0.15 % + 0.005 %/K x (T - 100 °C)} x {0.5+0.5 x TD}	< {0.40 % + 0.01 %/K x (T - 100 °C)} x {0.5+0.5 x TD}	< {0.30 % + 0.01 %/K x (T - 100 °C)} x {0.5+0.5 x TD}

Measuring cell - climate-compensated

Compensated temperature range 0 … +100 °C (+32 … +212 °F)

Non-compensated temperature range -40 … 0 °C (-40 … +32 °F), -100 … 130 °C (212 … +276 °F)

Nominal measuring range in bar/kPa	Nominal measuring range in psig	In the compensated temperature range	In the non-compensated temperature range
0 … 10 bar/0 … 1000 kPa	0 … 150 psig	< {0.05 % + 0.1 x (0.5+0.5 x TD)}	< {0.1 % + 0.15 x (0.5+0.5 x TD)}
0 … 25 bar/0 … 2500 kPa	0 … 350 psig		
0 … 60 bar/0 … 6000 kPa	0 … 900 psig		
0 … 100 bar/0 … 10000 kPa	0 … 1450 psig		
-1 … 0 bar/-100 … 0 kPa	-15 … 0 psig		
-1 … 1.5 bar/-100 … 150 kPa	-15 … 25 psig		
-1 … 10 bar/-100 … 1000 kPa	-15 … 150 psig		
-1 … 25 bar/-100 … 2500 kPa	-15 … 350 psig		
-1 … 60 bar/-100 … 6000 kPa	-15 … 900 psig		
-1 … 100 bar/-100 … 10000 kPa	-15 … 1450 psig		
0 … 1 bar/0 … 100 kPa	0 … 15 psig	< {0.1 % + 0.2 x (0.5+0.5 x TD)}	< {0.1 % + 0.3 x (0.5+0.5 x TD)}
0 … 2.5 bar/0 … 250 kPa	0 … 35 psig		
-0.5 … 0.5 bar/-50 … 50 kPa	-7 … 7 psig		
-0.2 … 0.2 bar/-20 … 20 kPa	-3 … 3 psig	< {0.15 % + 0.4 x (0.5+0.5 x TD)}	< {0.15 % + 0.6 x (0.5+0.5 x TD)}
0 … 0.4 bar/0 … 40 kPa	0 … 6 psig		

Long-term stability (according to DIN 16086 and IEC 60770-1)

Specifications refer to the set span. Turn down (TD) is the ratio: nominal measuring range/set span.

Long-term drift of the zero signal

Time period	Measuring cell ø 28 mm	Measuring cell ø 28 mm Measuring range 0 … +0.025 bar/0 … +2.5 kPa	Measuring cell ø 17.5 mm
One year	< 0.05 % x TD	< 0.1 % x TD	< 0.1 % x TD
Five years	< 0.1 % x TD	< 0.2 % x TD	< 0.2 % x TD
Ten years	< 0.2 % x TD	< 0.4 % x TD	< 0.4 % x TD

Long-term drift of the zero signal - Version climate-compensated

Nominal measuring range in bar/ kPa	Nominal measuring range in psig	Measuring cell ø 28 mm	Measuring cell ø 17.5 mm
0 … 0.4 bar/0 … 40 kPa	0 … 6 psig	< (1 % x TD)/year	< (1.5 % x TD)/year
-0.2 … 0.2 bar/-20 … 20 kPa	-3 … 3 psig		
0 … 1 bar/0 … 100 kPa	0 … 15 psig	< (0.25 % x TD)/year	< (0.375 % x TD)/year
0 … 2.5 bar/0 … 250 kPa	0 … 35 psig		
-1 … 0 bar/-100 … 0 kPa	-15 … 0 psig		
-1 … 1.5 bar/-100 … 150 kPa	-15 … 25 psig		
-0.5 … 0.5 bar/-50 … 50 kPa	-7 … 7 psig		
0 … 10 bar/0 … 1000 kPa	0 … 150 psig	< (0.1 % x TD)/year	< (0.15 % x TD)/year
0 … 25 bar/0 … 2500 kPa	0 … 350 psig		
0 … 60 bar/0 … 6000 kPa	0 … 900 psig		
0 … 100 bar/0 … 6000 kPa	0 … 1450 psig		
-1 … 10 bar/-100 … 1000 kPa	-15 … 150 psig		
-1 … 25 bar/-100 … 2500 kPa	-15 … 350 psig		
-1 … 60 bar/-100 … 6000 kPa	-15 … 900 psig		

Process conditions

Product temperature depending on the measuring cell seal[4)]

The specifications are an overview. The specification on the type plate are valid.

Measuring cell seal	Product temperature - standard version	Product temperature - version with extended temperature range
FKM (VP2/A)	-20 … +130 °C (-4 … +266 °F)	-20 … +150 °C (-4 … +302 °F)
FKM (A+P 70.16)	-40 … +130 °C (-40 … +266 °F)	-
FKM (ET 7067)	-20 … +130 °C (-4 … +266 °F) 1 h: 140 °C/284 °F cleaning temperature	-
EPDM (A+P 75.5/KW75F)	-40 … +130 °C (-40 … +266 °F) 1 h: 140 °C/284 °F cleaning temperature	-40 … +150 °C (-40 … +302 °F)
EPDM (ET 7056)	-40 … +130 °C (-40 … +266 °F) 1 h: 140 °C/284 °F cleaning temperature	-
FFKM (Kalrez 6375)	-20 … +130 °C (-4 … +266 °F)	-20 … +150 °C (-4 … +302 °F)
FFKM (Perlast G75S)	-15 … +130 °C (-4 … +266 °F)	-15 … +150 °C (5 … +302 °F)
FFKM (Perlast G75B)	-15 … +130 °C (-4 … +266 °F)	-15 … +150 °C (5 … +302 °F)
FFKM (Chemraz 535)	-30 … +130 °C (-22 … +266 °F)	-
FEPM (Fluoraz SD890)	-5 … +130 °C (-22 … +266 °F)	-

Product temperature depending on the ambient temperature

4) With process fitting PVDF, max. 100 °C (212 °F).

Ambient temperature	Product temperature
+50 °C (+122 °F)	+150 °C (+302 °F)
+80 °C (+176 °F)	+100 °C (+212 °F)

Mechanical stress, depending on the instrument version

Vibration resistance	4 g at 5 … 200 Hz according to EN 60068-2-6 (vibration with resonance)
Shock resistance	100 g, 6 ms according to EN 60068-2-27 (mechanical shock)

Ambient conditions

Version	Ambient temperature	Storage and transport temperature
Standard version	-40 … +80 °C (-40 … +176 °F)	-60 … +80 °C (-76 … +176 °F)
Version IP 66/IP 68 (1 bar)	-20 … +80 °C (-4 … +176 °F)	-20 … +80 °C (-4 … +176 °F)
Version IP 68 (25 bar) with connection cable PUR	-20 … +80 °C (-4 … +176 °F)	-20 … +80 °C (-4 … +176 °F)
Version IP 68 (25 bar), connection cable PE	-20 … +60 °C (-4 … +140 °F)	-20 … +60 °C (-4 … +140 °F)

Electromechanical data - version IP 66/IP 67 and IP 66/IP 68; 0.2 bar

Options of the cable entry

– Cable diameter (options)	5 … 9 mm (0.20 … 0.35 in)
	6 … 12 mm (0.24 … 0.47 in)
	10 … 14 mm (0.39 … 0.55 in)
– Cable entry	½ NPT
– Blind plug	M20 x 1.5; ½ NPT
– Closing cap	M20 x 1.5; ½ NPT

Plug options

– Signal circuit	Plug M12 x 1, according to ISO 4400, Harting HAN, 7/8" FF
– Indication circuit	M12 x 1 plug

Wire cross-section (spring-loaded terminals)

– Massive wire, cord	0.2 … 2.5 mm² (AWG 24 … 14)
– Stranded wire with end sleeve	0.2 … 1.5 mm² (AWG 24 … 16)

Electromechanical data - version IP 68 (25 bar)

Connection cable between IP 68 instrument and external housing

– Configuration	four wires, one suspension wire, one breather capillary, screen braiding, metal foil, mantle
– Wire cross-section	0.5 mm² (AWG 20)
– Wire resistance	< 0.036 Ω/m (0.011 Ω/ft)
– Standard length	5 m (16.40 ft)

– Max. length	180 m (590.5 ft)
– Min. bending radius at 25 °C/77 °F	25 mm (0.985 in)
– Diameter approx.	8 mm (0.315 in)
– Colour	Blue
Cable entry/plug[5]	
– External housing	– 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind plug M20 x 1.5 or: – 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
Spring-loaded terminals for wire cross-section up to	2.5 mm² (AWG 14)

Voltage supply, interface to the master sensor

Voltage supply	Through the master sensor
Data transmission	digital (I^2C-Bus)
Configuration, connection cable	4-wire, screened
Cable length max.	25 m

Potential connections in the instrument

Electronics	Not non-floating
Ground terminal	Galvanically connected with the process fitting

Electrical protective measures

Housing material	Version	IP-protection class	NEMA protection
Plastic	Single chamber	IP 66/IP 67	NEMA 4X/6P
Aluminium	Single chamber	IP 66/IP 68 (0.2 bar) IP 68 (1 bar)	NEMA 4X/6P -
Stainless steel, electro-polished	Single chamber Single chamber	IP 66/IP 68 (0.2 bar) IP 69K	NEMA 4X/6P -
Stainless steel, investment casting	Single chamber	IP 66/IP 68 (0.2 bar) IP 68 (1 bar)	NEMA 4X/6P NEMA 4X
Stainless steel	Transmitter for external housing	IP 68 (25 bar)	-

Overvoltage category	III
Protection class	II

Approvals

Instruments with approvals can have different technical data depending on the version.

For that reason the associated approval documents of these instruments must be carefully noted. They are part of the delivery or can be downloaded under www.vega.com and "*VEGA Tools*" as well as under "Downloads" and "*Approvals*".

[5] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

9.2 Dimensions

The following dimensional drawings represent only an extract of the possible versions. Detailed dimensional drawings can be downloaded at www.vega.com under "*Downloads*" and "*Drawings*".

Housing

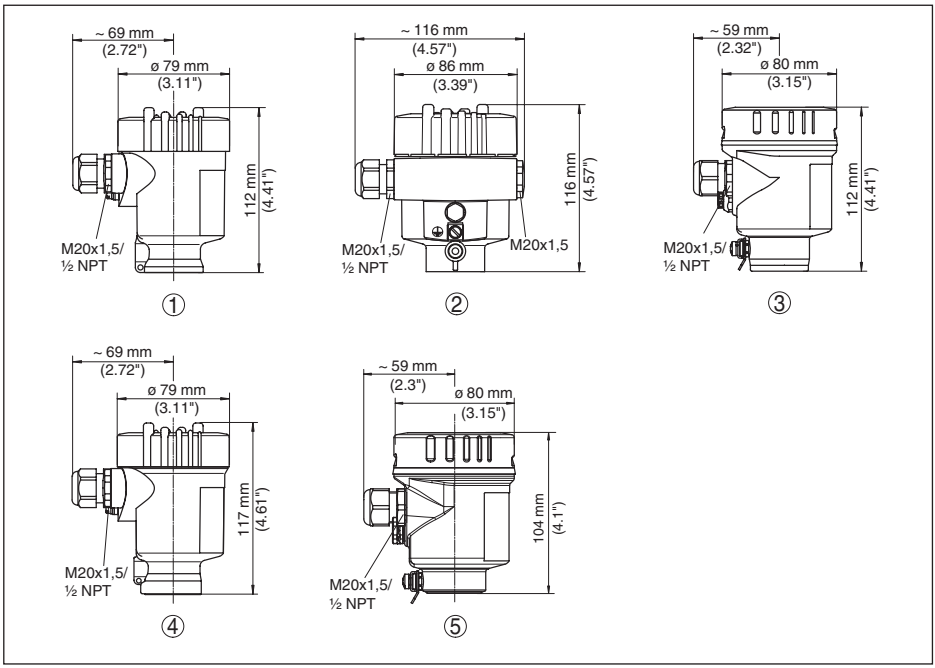


Fig. 27: Housing versions in protection IP 66/IP 67 and IP 66/IP 68 (0.2 bar)

1 *Plastic housing*
2 *Aluminium housing*
3 *Stainless steel housing, electropolished*
4 *Stainless steel housing, precision casting*
5 *Stainless steel housing, electropolished IP 69K*

External housing with IP 68 version

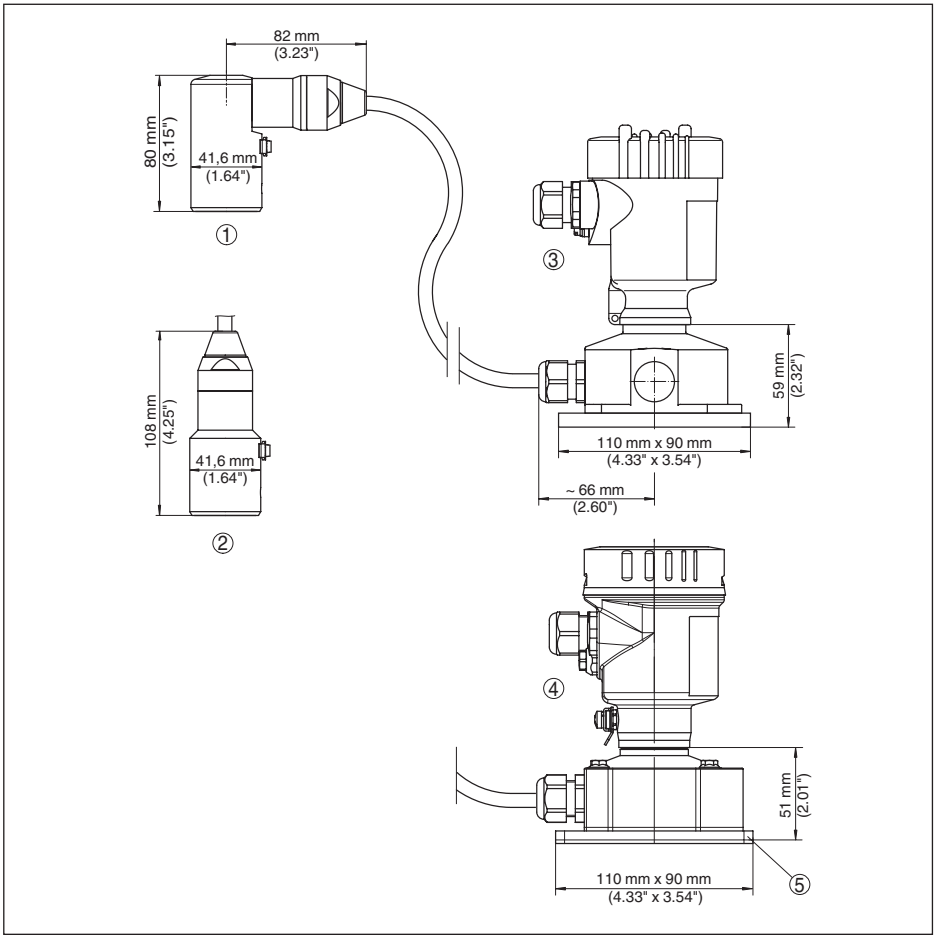


Fig. 28: IP 68 version with external housing - plastic version

1 *Lateral cable outlet*
2 *Axial cable outlet*
3 *Plastic version*
4 *Stainless steel version*
5 *Seal 2 mm (0.079 in) - only with 3A approval*

VEGABAR 82, threaded fitting not front-flush

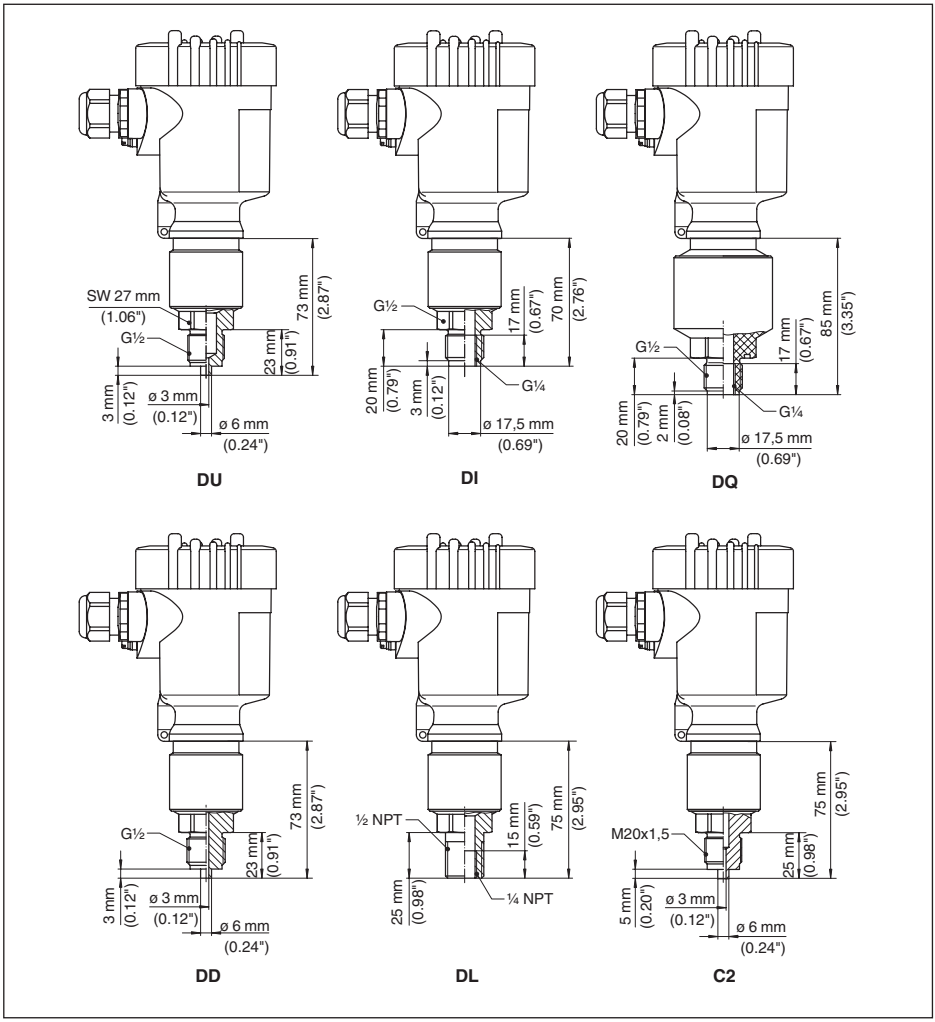


Fig. 29: VEGABAR 82, threaded fitting not front-flush

DU G½ manometer connection (EN 837)
DI G½ A inside G¼ (ISO 228-1)
DQ G½ A inside G¼ A PVDF (ISO 228-1)
DD G½ manometer connection (EN 837) volume-reduced
DL ½ NPT
C2 M20 x 1.5 manometer connection (EN 837)

VEGABAR 82, threaded fitting front-flush

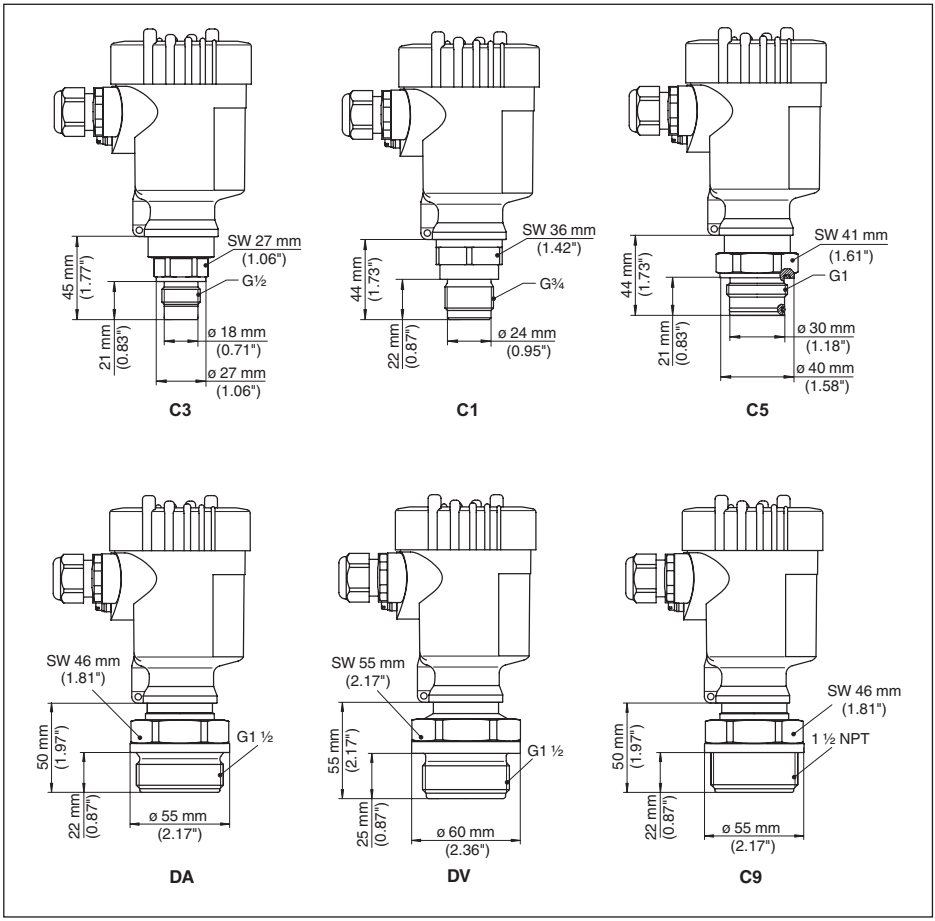


Fig. 30: VEGABAR 82, threaded fitting front-flush

C3 G½ (ISO 228-1)
C1 G¾ (DIN 3852-E)
C5 G1 A (ISO 228-1)
DA G1½ (DIN 3852-A)
DV G1½ A PVDF (DIN 3852-A-B)
C9 1½ NPT (ASME B1.20.1)

For the version with temperature range up to 150 °C/302 °F, the measure of length increases by 28 mm (1.1 in).

VEGABAR 82, hygienic fitting

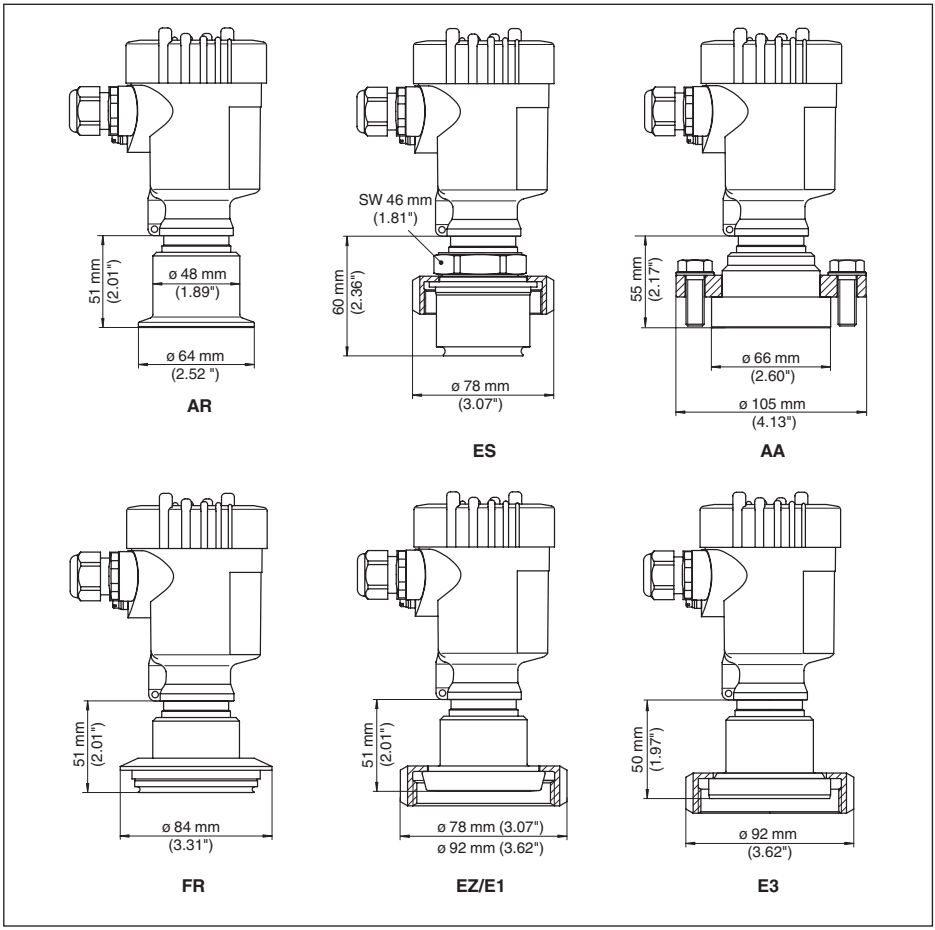
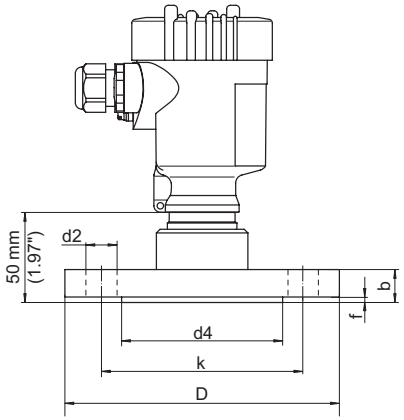


Fig. 31: VEGABAR 82, hygienic fitting

AR Clamp 2"
AS Clamp 2½
ES Hygienic fitting with compression nut F40
AA DRD
FR Tuchenhagen Varivent DN 32
EZ Bolting DN 40 according to DIN 11851
E1 Bolting DN 50 according to DIN 11851
E3 Bolting DN 50 according to DIN 11864-1

VEGABAR 82, flange connection



	mm	DN	PN	D	b	k	d2	d4	f
①	A8	40	40	150	18	110	4xø18	88	3
	B2	50	40	165	20	125	4xø18	102	3
	R5	80	40	200	24	160	8xø18	138	3
②	CA	2"	150 lbs	152,4	19,1	120,7	4xø19,1	91,9	3,2
	CB	3"	150 lbs	190,5	23,9	152,4	8xø19,1	127	3,2

	inch	DN	PN	D	b	k	d2	d4	f
①	A8	40	40	5.91"	0.71"	4.33"	4xø 0.71"	3.46"	0.12"
	B2	50	40	6.50"	0.79"	4.92"	4xø 0.71"	4.02"	0.12"
	B5	80	40	7.87"	0.95"	6.30"	8xø 0.71"	5.43"	0.12"
②	CA	2"	150 lbs	6"	0.75"	4.75"	4xø 0.75"	3.62"	0.13"
	CB	3"	150 lbs	7.5"	0.94"	6"	8xø 0.75"	5"	0.13"

Fig. 32: VEGABAR 82, flange connection

1 Flange connection according to DIN 2501
2 Flange connection according to ANSI B16.5

VEGABAR 82, extension fitting

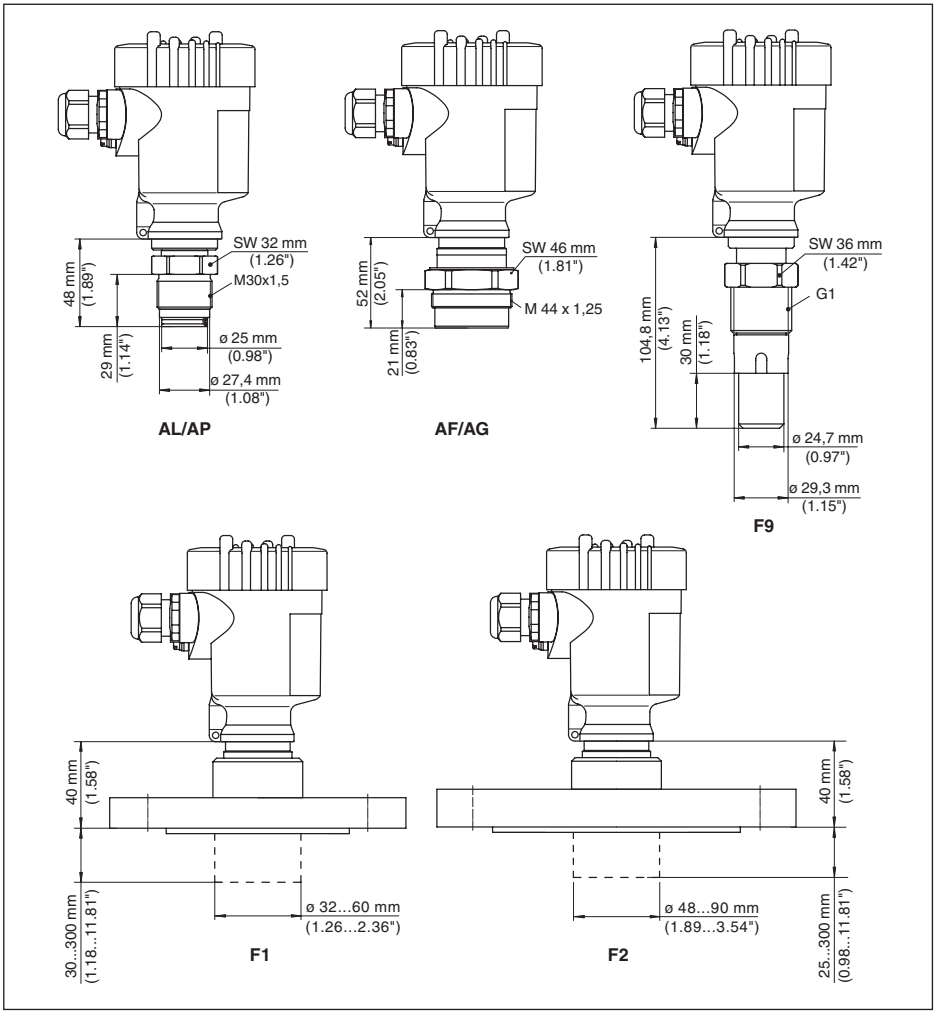


Fig. 33: VEGABAR 82, extension fitting

AL M30 x 1.5
AP M30 x 1.5 for headbox
AF/AG M44 x 1.25
F9 G1 (ISO 228-1) suitable for PASVE
F1 Flange DN 50 with selectable extension
F2 Flange DN 80 with selectable extension

9.3 Industrial property rights

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Only in U.S.A.: Further information see patent label at the sensor housing.

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